COUNTRY PRACTICE IN ENERGY STATISTICS

Topic/Statistics: Fuel input and district heat output of biomass heating plants

Institution/Organization: Statistics Austria

Country: Austria

Date: 03 April 2012

CONTENTS

Abstract

Write a short abstract of the statistics, and try to limit it to one page. The purpose of the abstract is to give the reader a general overview of the statistics/topic. It should therefore include a brief overview of the background and the purpose of the statistics, the population, the sample (if relevant), the main data sources, and the main users of the statistics. The abstract should also mention what is the most important contribution or issue addressed in the country practice (e.g. the practice deals with challenges of using administrative data, using of estimation, quality control, etc.). If there are other elements that are considered important, please feel free to include them in the abstract.

Keep in mind that all relevant aspects of the statistical production will be covered in more detail under the different chapters in the template. Therefore, the abstract should be short and focused on the key elements. What the most important elements are can vary from statistics to statistics, but as a help to write an abstract you can use the table below. The table can either replace a text or can be filled out in addition to writing a short text.

The main objective of this survey is to provide a reliable database for the compilation of energy balances.
Additionally, since the RES Directive*) came into force, this survey is an important data source for the reporting duties according to this directive, where the target for a share of energy from renewable sources on the gross final energy consumption for Austria was set at 34%.
This statistics comprises transformation input broken down by fuels and the associated district heat production of biomass heating plants.
The survey is a voluntary census, based on an annual survey by the Agricultural Chamber of Lower Austria on the total number of biomass district heating plants and the installed capacity. The actual population for the reference year 2008 was 1 453 plants.
The results of the survey are a key part of a model to extrapolate the production of district heat and the corresponding transformation input of the respective fuels on an annual base.

*) Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

Key elements	
Name of the statistics	Fuel input and district heat output of biomass heating plants
Background and purpose of the statistics	Survey the fuel input and corresponding district heat output of biomass heating plants
Population, sample and data sources	Voluntary census, based on an annual survey by the Agricultural Chamber of Lower Austria on the total number of biomass heating plants (the population in the reference year 2008 was about 1 500 plants) and the installed boiler capacity in these heating plants
Main users	Statistics Austria: Energy balance
Important contribution or issue addressed	Energy balance
Other remarks	Survey and model based extrapolation of the district heat production in biomass heating plants

1. General information

1.1. Name of the statistics/topic

The statistics/topic could either be a specific energy statistics (e.g. electricity production) or a topic within energy statistics (e.g. energy balances). For more information, please see Section III of the Instructions.

Fuel input and district heat output of biomass heating plants.

1.2. History and purpose

State when the statistics were first published.

The survey was carried out the first time for the reference year 1997 by the Austrian Biomass Association on behalf of Statistics Austria. For the reference year 2005, the survey was conducted the first time by Statistics Austria itself. Due to the dynamic increase in the number of biomass heating plants, the latest survey was carried out for the reference year 2009 instead of 2010. The results of the survey are not published directly, but incorporated into the current energy balance.

Describe briefly the main purpose of producing the statistics and why it is relevant.

The main objective of this survey is to provide a reliable database for the compilation of Austrian energy balances, thus meeting the increased requirements that are applied to these statistics. Additionally, this survey is an important data source for the reporting duties according to the RES (Renewable Energy Sources) Directive, where the target for a share of energy from renewable sources on the gross final energy consumption for Austria was set at 34%.

1.3. Reference period

State the time period the data are collected for.

Calendar year

1.4. Frequency

Specify how often the statistics are disseminated (e.g. annually, monthly, quarterly, etc.). If the statistics are not produced at regular intervals, state at what times they have been produced in the past and the main reasons behind the irregularities.

Five-yearly cycle

1.5. Dissemination

Describe how the statistics are published (e.g. printed publications, online publications, online databases, etc.). If applicable, include the web address to the main website of the statistics.

The results of the survey are not published directly, but the extrapolated data from the model are released annually together with the most recent energy balances (t+11) online on the webpage of Statistics Austria (www.statistik.at).

1.6. Regional level

State the lowest geographical level (e.g. administrative regions, municipalities, etc.) for which the statistics are made available to the public.

NUTS 2.

1.7. Main users

Identify the key users of the data and the main applications. Include both internal and external users, and if possible try to distinguish between end users and others.

Statistics Austria, Directorate Spatial Statistics: Energy balance.

1.8. Responsible authority

Write the name of the institution and department/office with the main responsibility for disseminating the statistics (e.g.: Statistics Norway, Department of Economics, Energy and the Environment).

Statistics Austria, Directorate Spatial Statistics, Energy & Environment Department.

1.9. Legal basis and legally binding commitments

State the national legal basis for the data collection. Include a complete reference to the constitutional basis, and web address to an electronic version (e.g.: The Statistics Act of 16 June 1989 No. 54, §§2-2 and 2-3, http://www.ssb.no/english/about_ssb/statlaw/forskrift_en.html).

Federal Statistics Act 2000, as amended, http://www.statistik.at/web_en/about_us/responsibilities_and_principles/statistics_act/index.html.

If the data collection is not based on a legal basis, give a short description of other agreements or volunteer arrangements

Five-year contracts with the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and the Austrian Federal Ministry of Economics, Family and Youth (BMWFJ, formerly BMWA).

If applicable, give reference to national and international commitments that are legally binding (e.g. EU statistical legal acts).

Regulation (EC) No. 1099/2008 of the European Parliament and of the Council of 22 October 2008 on Energy Statistics.

1.10. Resource requirements

Specify how the production of the statistics is financed (e.g. over the ordinary budget, project based support, financial support from other institutions or organization). If applicable, state the contracting entity (e.g.: Ministry, EU Commission, OECD). A contracting entity is any entity which is ordering a survey or the compilation of a statistics, and paying for it

The survey is financed by BMLFUW and BMWFJ, each ministry covers 50% of the implementation costs.

Specify the resource requirements for producing the statistics (e.g. man-labour days, number of workers involved in the statistical production process of the statistics/topic in question).

Resource requirements are about 150 man-labour days, with two workers involved.

1.11. International reporting

List any international organizations and names of reporting schemes that the statistics are reported to. If available, also include the website where the reported data are published (e.g. International Energy Agency, Monthly Oil Statistics, UNSD, etc.).

Not relevant.

2. Statistical concepts, methodology, variables and classifications

2.1. Scope

Describe the scope of the statistics (e.g. the statistics cover supply and use of all energy products in Norway, classified according to International Standard Industrial Classification of All Economic Activities – ISIC).

This statistics cover the transformation input broken down by fuel type and the corresponding district heat production of biomass heating plants.

2.2. Definitions of main concepts and variables

Describe the main concepts (e.g.: territory principle, resident principle, net calorific value, gross calorific value).

Specific conversion factors and net calorific values for wood based fuels.

Describe the main variables (e.g. how are the different energy products defined in the statistics? How are production, intermediate consumption, final consumption, transformation, feed stock, the energy sector, etc. defined?).

District heat production is broken down by fuel type as follows:
- biofuels: wood chips, industrial wood chips, sawdust, bark, straw, other biofuels
- fossil fuels: fuel oil, natural gas, other fossil fuels

2.3. Measurement units

Describe in what unit the data is collected (e.g. physical unit (m3, metric tons), monetary unit (basic prices, market prices)). Describe in what unit the data is presented. Describe if the calorific values are collected (e.g. on a net vs. gross basis) and how they are used.

If applicable, describe the density of the energy product(s) and the estimated thermal efficiency coefficients of different energy products and consumer groups or by appliance. Thermal efficiency coefficient indicates the share of the energy products which is actually usable for end consumption. Descriptions of density and thermal efficiency coefficient could alternatively be put in an annex.

Fuels can be reported by the respondents as follows:
- Solid biofuels: metric tons air dry (t air dry) and absolutely dry (t abs dry), solid cubic meter (scm) and bulk cubic meter (bcm)
- Liquid biofuels and fuel oil: 1 000 litres and tons
- Gaseous biofuels and natural gas: 1 000 cubic meters (m^3) and megawatt hours (MWh)
- Other fuels: to be specified by the respondents (e.g. litres or kg for LPG)

The reported fuel amounts are converted into compatible units (biomass: t air dry, fuel oil: 1 000 litres, natural gas 1 000 m³) with specific factors and the energy content of the wood based fuels is calculated at heating plant level with following conversion factors:

Wood based fuels	t air dry	t abs dry	scm	bcm	NCV (kWh/t air dry)
wood chips	1.000	0.650	1.560	4.717	3 165
industrial wood chips	1.000	0.700	1.681	4.808	3 461
sawdust	1.000	0.900	2.000	6.061	4 643
bark	1.000	0.500	1.272	4.237	2 299

Non-wood based fuels				
straw	1.000 t air dry	0.850 t abs dry	8.000 m³	3 800 kWh
fuel oil	1 000 litres	0.841 t		10 011 kWh
natural gas	1 000 m³			11 110 kWh
biodiesel	1 000 litres	0.920 t		9 353 kWh
biogas	1 000 m³			6 500 kWh

Additionally to the fuel amounts, values (prices) were asked to perform plausibility checks.

2.4. Classification scheme

Include references to relevant international and national standard classifications. If national, give a brief description of the standards. If available, include web addresses to the electronic version of the standards).

Not relevant.

2.5. Data sources

Give an overview of the different data sources used in the collection and compilation of the statistics/topic (e.g. household survey, enterprise/establishment survey, administrative data/registers, foreign trade statistics, production statistics and other primary/secondary data sources).

Examples of administrative sources/registers are: business register for enterprises and establishments, population register, land register, housing and building registers, tax registers, international trade registers, etc.

Annual survey by the Agricultural Chamber of Lower Austria on the total number of biomass heating plants and the corresponding installed boiler capacity

2.6. Population

Describe the entire group of units which is the focus of the statistics (the population).
Specify the following statistical units:

- *Reporting unit*
- *Observational unit*
- *Analytical unit*

Examples of different kind of statistical units include: enterprise, enterprise group, kind-of-activity unit (KAU), local unit, establishment, homogeneous unit of production.

In most cases the reporting unit, observational unit and analytical unit are identical, but there are examples where this is not the case. In electricity statistics, you may find that energy companies (the

reporting unit) provide data about different consumers like the individual household or manufacturing company (the observational unit). The analytical unit may be a group of energy consumers, defined by the ISIC.

Biomass heating plants with an installed thermally boiler capacity ≥ 100 kW_{th} and combined heat and power plants with an installed electrically capacity < 1MW_{el} (current status of the population in the year 2008: about 1 500) serve as reporting, observational and analytical unit.

2.7. Sampling frame and sample characteristics

Describe the type of sampling frame used in the collection and compilation of the statistics (e.g. list, area or multiple frames). A sampling frame is the source material or device from which a sample is drawn. Note that the sampling frame might differ from the population.

For each survey(s) used for the compilation of the statistics, specify the sampling design (e.g. random, stratified, etc.). Describe the routines employed for updating the sample. Include information about the sample size, and discuss to what extent the sample covers the population (e.g. energy consumption in the sample compared to total energy use by the population).

Note that chapter 2.7: Sample frame and sample characteristics may overlap with chapter 3.4: Grossing up procedures.

Not relevant, due to a full sample survey.

2.8. Collection method

For each survey used for the compilation of the statistics/topic, describe how the data are collected (e.g. face-to-face, telephone, self-administered, paper and internet-based questionnaires, or administrative data and registers).

By post and electronically, that is to say, the survey forms are sent by post but the respondents have the option of obtaining and returning the questionnaire electronically by email. In 2010 a web-based questionnaire (eQuest) was available. The questionnaires of both surveys conducted by Statistics Austria are shown in the Annex.

2.9. Survey participation/response rate

For each survey used for the compilation of the statistics/topic, specify the average response rate, or refer to response rates for specific surveys conducted.

For both surveys, the response rate of the contacted biomass district heating plants was satisfying (in the reference year 2005: 42% or 406 of 971 biomass district heating plants, in the reference year 2009: 43% or 631 of 1 453 biomass district heating plants).

3. The statistical production process

3.1. Data capture and storage

Describe how the data is captured and stored (e.g. if the respondent replies using Internet-based questionnaire, the received data are electronically transferred to the production database. Paper questionnaire responses are keyed manually to the production database).

Manual data capture by the department and electronically submitted data.

3.2. Data editing

Describe the regular routines employed for detecting and correcting errors. This may include:

- *Manual routines for detecting and correcting errors*
- *Automatic error-detection (and correction)*
- *Micro- and macro editing procedures*
- *Data validation procedures*
- *Outlier identification*
- *Processes and sources used for quality controls*

Plausibility checks of the stated quantities with reference to the stated values and annual average prices. In addition, respondents were contacted by telephone if data were implausible.

3.3. Imputation

Describe the principles for imputation and the assumptions that these principles are based on. Note that this chapter may overlap with chapter 3.2: Data editing and chapter 5.2: Accuracy

Missing fuel quantities are calculated using average prices.
Missing data for the district heat output are imputed by multiplying the fuel input with the according calorific value and a mean biomass heating plant efficiency of 75% (total mean efficiency of all participating biomass district heating plants).

3.4. Grossing up procedures

Describe how the population is divided into strata and what statistical models the estimations in the strata are based on. Describe how sub-indices are combined into aggregate indices and how uncertainty is estimated.

Not relevant.

3.5. Analytical methods

Give a description of any analytical methods used to adjust the data (e.g.: seasonal adjustment and temperature adjustment). A more detailed description of the analytical method can also be included as an annex.

The district heat production in biomass heating plants is calculated as a model based extrapolation, using specific factors for the fuel input and the district heat production as well as heating degree days.

A more detailed description of the analytical method can be found in the annex.

4. Dissemination

4.1. Publications and additional documentation

Describe the form of dissemination of the statistics/topics in question (e.g. printed publications, website, etc.). Please provide relevant website link(s) if available.

Give a complete reference to publicly available statistics databases where data from the statistics can be extracted. Include web addresses if available online.

Indicate whether you charge users for access to the statistics at any level of aggregation.

The results of the survey are not published directly, but the extrapolated data from the model are released annually together with the most recent energy balances (t+11) online on the webpage of Statistics Austria (www.statistik.at).

4.2. Revisions

Describe the current revision policies. E.g.: Is historical data revised when new methodology, new definitions, new classifications etc. are taken into use? Is the data continuously revised, or is the data revised at certain points in times (e.g. every third year, annually, etc.)?

If applicable, describe any major conceptual or methodological revisions that have been carried out for this statistic/topic in the past.

The most recent survey is extrapolated for the subsequent years with the corresponding heating degree days and the installed nominal boiler capacity, provided by the Agricultural Chamber of Lower Austria. After each follow-up survey, the district heat production and the corresponding transformation input for the used fuels is revised with the heating degree days and the moving average of the specific district heat output and the specific fuel input.

4.3. Microdata

Describe how microdata are stored.

Specify if microdata are available for scientific and/or public use. If so, describe under what conditions these are made available.

Microdata are stored as MS Excel files and are not available for scientific and/or public use.

4.4. Confidentiality

Describe the legal authority that regulates confidentiality, and what restrictions are applied to the publication of the statistics.

Describe the criteria used to suppress sensitive data in statistical tables (cell suppression).

Describe how confidential data are handled.

Describe any confidentiality standards that go beyond what is legally required.

Not relevant, since data are not available for scientific and/or public use.

5. Quality

5.1. Relevance

State to which degree the statistical information meet the real needs of clients/users.

The main objective of the survey is to provide a reliable database for the compilation of energy balances. Additionally, this survey is an important data source for the reporting duties according to the RES (Renewable Energy Sources) Directive, where the target for a share of energy from renewable sources on the gross final energy consumption for Austria was set at 34%.

5.2. Accuracy

State the closeness of computations or estimates to the exact or true values that the statistics were intended to measure.

Measurement and processing errors

Discuss the measurement and processing errors that are relevant for the statistics. Try as far as possible to give an estimation of the size and scope of the errors.

Not known.

Non-response errors

State the size of the unit non-response and the item non-response, distributed by important variables in the population (e.g. region, industry). Consider if the non-response errors are systematic, and if so, describe the methods used to correct it. Indicate whether the effects of correcting non-response errors on the results have been analysed, and, if so, describe them.

Unit non-response: 58% in 2005 and 57% in 2009 as reference years. Item noon-response: not relevant, because missing data were calculated using average prices, or imputed by multiplying the fuel input with the according calorific value and a mean heating plant efficiency.

Sampling errors

Discuss the size of the sampling errors. Compare the population and sample with regards to important properties (e.g. coefficient of variance).

Not relevant, due to a full sample survey

Other sources of error

Discuss other sources of errors that might be relevant for the statistics. E.g.: Model assumption errors, coverage errors

Concentration of imputed cases using average prices is likely to occur.

5.3. Timeliness and punctuality

Specify the time between the end of the reference period and publication.
If the statistics are published both as preliminary and final figures, specify the time between publication of preliminary and final figures. You should also point out whether the publication date is set according to certain rules (e.g. advance release calendar, a specific day or prior to other publications).

The results are available for the final energy balances of the respective year under review.

Point out if there have been any major discrepancies between the planned publication date and the actual publication date in recent years. If so, state the length of this discrepancy and its cause.

No discrepancies between the planned publication date and the actual publication date in recent years occurred.

5.4. Accessibility

Describe how easily accessible the statistics are. In particular, is there an advance release calendar to inform the users about when and where the data will be available and how to access them?

Are metadata and other user support services easily available? Are there particular groups that don't have access to the published statistics (e.g.: visually disadvantaged)?

Not relevant, since data are not available for scientific and/or public use.

5.5. Comparability

Discuss the comparability of the statistics over time, geographical areas and other domains.

Comparability over time
Discuss comparability over time and include information about whether there have been any breaks in the time series of the statistics and why. Also describe any major changes in the statistical methodology that may have had an impact on comparability over time.

Because of the identical methodology, the comparability over time of the survey in the year 2010 with the same survey by Statistics Austria in the year 2006 is given.

Comparability over region
Discuss comparability over geographical areas, and include information about whether the statistics are comparable to relevant statistics published by other countries and/or international organisations.

In the context of energy balances, the spatial and sectoral comparability, for the fuels included, is given with other EU or IEA member states.

Comparability over other domains

Discuss comparability over domains, and include information about whether the statistics are comparable between different industries, different types of households etc.

Not relevant.

5.6. Coherence and consistency

Discuss the coherence/consistency between preliminary and final figures.
Discuss the coherence/consistency between monthly, quarterly or yearly statistics within the same subject area. Can the results of different frequencies for the same reference period be combined in a reliable manner?
Discuss the coherence/consistency with other related statistics (also those produced by other institutions/organisations on the same subject).

Coherence with comparable primary statistics, used as data sources for energy balances (material input statistics, sample surveys on energy consumption in the service and production sector, sample survey on energy consumption of households and useful energy analysis) is given.

6. Future plans

Are there any current or emerging issues that will need to be addressed in the future? These could include gaps in collection, timeliness issues, data quality concerns, funding risks, confidentiality concerns, simplifications to reduce respondents' burden etc.?

Due to public funding of district heat from biomass and an existing potential due to a relatively high abundance of wood in some Laender, a dynamic future increase of the number of biomass district heating plants with a corresponding fuel input and district heat output can be expected in Austria. Therefore, it is planned to continue with a survey frequency of five years.

Annexes

Standard documentation
Meta information

(Definitions, comments, methods, quality)

On the full sample survey

Fuel input and district heat output of biomass heating plants

This documentation is valid for the reference period:

2005 to 2010

Status: **March 2011**

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Contents

Executive Summary

Preliminary remarks

The demand for energy data rocketed after the Kyoto protocol was signed. To meet the quality standards needed several new surveys had to be established (to improve the quality of the Austrian Energy Balances and to develop Energy Accounts). One of these surveys is this one.

Objective and purpose

The main objective of the survey is to provide a reliable database for the compilation of energy balances. Additionally, since the RES Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC) came into force, this survey is an important data source for the reporting duties according to this directive, where the target for a share of energy from renewable sources in the gross final energy consumption for Austria was set at 34%.

Subject of the statistics

This statistics covers transformation input broken down by fuels and the associated district heat production of biomass heating plants.

Data sources, coverage

The survey is a voluntary census based on an annual survey by the Agricultural Chamber of Lower Austria (LK NÖ) on the total number of biomass district heating plants and the installed capacity. The actual population is 1 453 plants.

Data preparation

The results of the survey are a key part of a model to extrapolate the production of district heat and the corresponding transformation input of the respective fuels on an annual base.

Quality

Data quality generally is good.

Publication

The results of the survey are not published directly. The extrapolated data from the model are released annually together with the most recent energy balances (t+11) on the homepage of Statistics Austria.

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Fuel input and district heat output of biomass lighted district heating plants Important elements	
Main purpose of the statistics	Fuel input and the corresponding transformation output of district heat in biomass district heating plants
Observed unit / reporting unit / presentation unit	Biomass lighted district heating plants with an installed nominal boiler capacity ≥100 kW_{th} and CHP plants with an installed capacity < 1MW_{el}.
Type of statistics	Primary statistics
Data sources/Survey techniques	Census, based on an annual survey by the Agricultural Chamber of Lower Austria (LK NÖ) on the total number of biomass district heating plants and the installed capacity
Reference periods or due day	2005 to 2010
Periodicity	five yearly
Survey participation	Voluntary survey
Legal bases	Federal Statistics Act 2000 as amended Five-year contracts with the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Austrian Federal Ministry of Economy, Family and Youth Regulation (EC) No. 1099/2008 of the European Parliament and of the Council of 22 October 2008 on Energy Statistics.
Regional breakdown	Laender of Austria
Availability of the results	Preliminary data: annually together with the most recent energy balance (t+11) Final data: t + 3 after the follow up survey
Other	Survey and model based extrapolation

1. General information

6.1. Objective and purpose, history

The number of biomass district heating plants in Austria as well as district heat output and the corresponding fuel input increased continuously over the last 15 years.

The main objective of the survey is to provide a reliable database for the compilation of energy balances. The results of the survey are a key part of a model to extrapolate production of district heat and the corresponding transformation input of the respective fuels on an annual base. The extrapolated results will be integrated into the energy balances.

Since the RES Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC), where the target for a share of energy from renewable sources in the gross final consumption of energy was set for Austria at 34%, came into force, this survey is an important data source for the reporting duties along this directive, additionally.
The survey was carried out the first time in the year 1998 by the Austrian Biomass Association on behalf of Statistics Austria. In the year 2006, the survey was conducted by Statistics Austria. Due to the dynamic increase in the number of biomass power plants, the latest survey was preponed from 2011 to 2010 to have a reliable database for the compilation of the Austrian energy balances.

6.2. Contracting entity

- Austrian Federal Ministry of Economics, Family and Youth (BMWFJ, formerly BMWA) and
- Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW).

6.3. Main users

Statistics Austria, Directorate Spatial Statistics.

6.4. Legal basis

- Federal Statistics Act 2000, as amended,
- Five-year contracts with the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and the Austrian Federal Ministry of Economy, Family and Youth (BMWFJ – formerly BMWA),
- Regulation (EC) No. 1099/2008 of the European Parliament and of the Council of 22 October 2008 on Energy Statistics.

Concepts and Processing

6.5. Statistical concepts and methodology

Statistical purpose

Objects of the survey are the acquisition of data about the annual fuel input in biomass district heating plants and the corresponding transformation output of district heat, broken down into the fuels wood chips, industrial wood chips, sawdust, bark, straw, other solid biomass, fuel oil, natural gas and others.

Observation unit / reporting unit / analytical unit

Biomass lighted district heating plants with an installed nominal boiler capacity ≥ 100 kW_{th} and CHP plants with an installed capacity < 1MW_{el}.

Data sources, coverage

The population for the survey is a dataset provided by the Agricultural Chamber of Lower Austria (LK NÖ), which annually records the total number of biomass district heating plants and the installed boiler nominal capacity in the Laender of Austria.

Reporting unit and respondents

Biomass district heating plants

Survey format

Census

Sample characteristics

Not relevant

Survey techniques / data transmission

By post and electronically, that is to say, the survey forms are sent by post but the respondents have the option of obtaining and returning the questionnaire electronically by e-mail. In 2010 a web-based questionnaire (eQuest) was available.

Survey questionnaire (including explanatory notes)

The questionnaires of both surveys conducted by Statistics Austria are shown in the Annexes.

Survey participation

For both surveys, the response rate of the contacted biomass district heating plants was satisfying (in the year 2006: 41,8% or 406 of 971 biomass district heating plants, in the year 2010: 43,4% or 631 of 1 453 biomass district heating plants).

Survey items, derived data elements, indicators (including definitions)

Transformation inputs broken down by fuel type:

Biofuels :

- wood chips,
- industrial wood chips,
- sawdust,
- bark,
- straw,
- others (to be specified)

Other fuels :

- fuel oil,
- natural gas,
- others (to be specified)

Reporting units:

Biofuels:

- tons air dried (t-lutro), tons absolutely dry (t-atro)
- solid cubic meter (scm)
- loose cubic meter (lcm)

Other fuels:

- tons (t)
- Megawatt hours (MWh)
- 1.000 litres
- 1.000 cubic meters (m^3)

The reported fuel amounts are converted into compatible units (biomass: t-lutro, fuel oil: 1.000 litres, natural gas 1.000 m^3) with specific factors and the energy content of the wood based fuels is calculated at heating plant level (Table 1).

Table 1. Conversion factors for wood-based fuels (Source: Austrian Energy Agency, 2007).

Sortiment	Water-content [%]	bulk volume [m³]	stere [30 cm]	stere [100 cm]	loose cubic meter	t air dry	t absolutely dry	Calorific Value (MWh)	Calorific Value (GJ)
scm equivalent (SW & HW mixture)	35%				1,000	0,641	0,417	2,029	7,304
					1,560	1,000	0,650	3,165	11,394
					2,398	1,538	1,000	5,235	18,846
					0,493	0,316	0,191	1,000	3,600
					0,137	0,088	0,053	0,278	1,000
Chippings G30 (SW & HW mixture)	35%	1,000			0,400	0,256	0,166	0,810	2,917
		2,500			1,000	0,641	0,417	2,029	7,304
		3,906			1,560	1,000	0,650	3,165	11,394
		6,024			2,398	1,538	1,000	5,235	18,846
		1,235			0,493	0,316	0,191	1,000	3,600
		0,343			0,137	0,088	0,053	0,278	1,000
Chippings G50 (SW & HW mixture)	35%	1,000			0,330	0,212	0,138	0,671	2,416
		3,030			1,000	0,641	0,417	2,029	7,304
		4,717			1,560	1,000	0,650	3,165	11,394
		7,246			2,398	1,538	1,000	5,235	18,846
		1,490			0,493	0,316	0,191	1,000	3,600
		0,414			0,137	0,088	0,053	0,278	1,000
Chippings from sawmills (SW & HW with & without bark mixture)	30%	1,000			0,350	0,208	0,146	0,720	2,592
		2,857			1,000	0,595	0,417	2,059	7,414
		4,808			1,681	1,000	0,700	3,461	12,460
		6,849			2,398	1,429	1,000	5,235	18,846
		1,389			0,486	0,289	0,191	1,000	3,600
		0,386			0,135	0,080	0,053	0,278	1,000
Chippings from sawmills (SW & HW with & without bark mixture)	50%	1,000			0,350	0,292	0,146	0,665	2,395
		2,857			1,000	0,833	0,417	2,183	7,859
		3,425			1,200	1,000	0,500	2,278	8,201
		6,849			2,398	2,000	1,000	5,235	18,846
		1,504			0,458	0,439	0,191	1,000	3,600
		0,418			0,127	0,122	0,053	0,278	1,000
Off-cuts (large) (SW & HW with & without bark mixture)	45%	1,000			0,500	0,379	0,208	0,975	3,511
		2,000			1,000	0,757	0,416	2,178	7,840
		2,639			1,321	1,000	0,550	2,573	9,263
		4,808			2,404	1,818	1,000	5,235	18,846
		1,026			0,459	0,389	0,191	1,000	3,600
		0,285			0,128	0,108	0,053	0,278	1,000
Off-cuts (small) (SW & HW with & without bark mixture)	40%	1,000			0,600	0,416	0,250	1,194	4,296
		1,667			1,000	0,694	0,416	1,991	7,168
		2,404			1,441	1,000	0,600	2,869	10,328
		4,000			2,404	1,667	1,000	5,235	18,846
		0,838			0,502	0,349	0,191	1,000	3,600
		0,233			0,140	0,097	0,053	0,278	1,000
Sawdust (SW & HW with & without bark mixture)	10%	1,000			0,330	0,165	0,149	0,766	2,758
		3,030			1,000	0,500	0,450	2,322	8,358
		6,061			2,000	1,000	0,900	4,643	16,715
		6,711			2,222	1,111	1,000	5,235	18,846
		1,305			0,431	0,215	0,191	1,000	3,600
		0,363			0,120	0,060	0,053	0,278	1,000

Table 1 (continued). Conversion factors for wood-based fuels (Source: Austrian Energy Agency, 2007).

Sortiment	Water-content [%]	bulk volume [m³]	stere [30 cm]	stere [100 cm]	loose cubic meter	t air dry	t absolutely dry	Calorific Value (MWh)	Calorific Value (GJ)
Other wood and wood waste (KN 4401 30 90)	10%				1,000	0,600	0,540	2,827	10,177
					1,667	1,000	0,900	4,643	16,7148
					1,852	1,111	1,000	5,235	18,846
					0,354	0,215	0,191	1,000	3,600
					0,098	0,060	0,053	0,278	1,000
Bark (SW)	50%	1,000			0,300	0,236	0,118	0,543	1,953
		3,333			1,000	0,786	0,393	1,807	6,505
		4,237			1,272	1,000	0,500	2,299	8,276
		8,475			2,545	2,000	1,000	5,278	19,001
		1,842			0,553	0,435	0,189	1,000	3,600
		0,512			0,154	0,121	0,053	0,278	1,000
Pellets (Spruce)	8%	1,000			1,455	0,652	0,600	3,130	11,269
		0,687			1,000	0,448	0,413	2,151	7,743
		1,534			2,232	1,000	0,920	4,801	17,284
		1,667			2,421	1,087	1,000	5,278	19,000
		0,316			0,459	0,206	0,189	1,000	3,600
		0,088			0,128	0,057	0,053	0,278	1,000
Briquettes (SW & HW mixture) (Nadel- und Laubholz)	8%	1,000			1,541	0,761	0,700	3,624	13,045
		0,649			1,000	0,494	0,455	2,352	8,468
		1,314			2,024	1,000	0,920	4,762	17,142
		1,429			2,198	1,087	1,000	5,235	18,846
		0,273			0,420	0,208	0,191	1,000	3,600
		0,077			0,117	0,058	0,053	0,278	1,000
Hardwood mixture	20%	1,000	0,588	0,714	0,500	0,365	0,292	1,410	5,078
		1,700	1,000	1,214	0,850	0,621	0,497	2,400	8,639
		1,400	0,824	1,000	0,700	0,511	0,409	1,975	7,109
		2,000	1,176	1,429	1,000	0,730	0,584	2,821	10,155
		2,740	1,610	1,957	1,370	1,000	0,800	3,864	13,911
		3,425	2,012	2,445	1,712	1,250	1,000	5,000	18,000
		0,685	0,402	0,489	0,342	0,250	0,200	1,000	3,600
		0,190	0,112	0,136	0,095	0,069	0,056	0,278	1,000
Softwood mixture	20%	1,000	0,588	0,714	0,500	0,250	0,200	1,022	3,678
		1,700	1,000	1,214	0,850	0,425	0,340	1,737	6,252
		1,400	0,824	1,000	0,700	0,350	0,280	1,430	5,149
		2,000	1,176	1,429	1,000	0,500	0,400	2,043	7,356
		4,000	2,353	2,857	2,000	1,000	0,800	4,086	14,711
		5,000	2,941	3,571	2,500	1,250	1,000	5,278	19,000
		0,947	0,557	0,677	0,474	0,237	0,189	1,000	3,600
		0,263	0,155	0,188	0,132	0,066	0,053	0,278	1,000
Fuelwood (SW & HW mixture)	20%	1,000	0,588	0,714	0,500	0,308	0,246	1,224	4,408
		1,700	1,000	1,214	0,850	0,523	0,419	2,079	7,485
		1,400	0,824	1,000	0,700	0,431	0,345	1,713	6,168
		2,000	1,176	1,429	1,000	0,615	0,492	2,445	8,801
		3,252	1,912	2,323	1,626	1,000	0,800	3,975	14,311
		4,065	2,389	2,903	2,033	1,250	1,000	5,139	18,500
		0,791	0,465	0,565	0,396	0,243	0,195	1,000	3,600
		0,220	0,129	0,157	0,110	0,068	0,054	0,278	1,000

For non-wood based fuels, the energy content is estimated by means of standard conversion factors which were agreed by all relevant Austrian actors and experts (Table 2).

Table 2. Conversion factors for non-wood based fuels.

Fuel	Conversion	
Straw *)	1 m³	0,125 t
Cereal grains	1 lcm	0,760 t
Fuel oil	1.000 l	0,841 t
	1 t	11.903 kWh
Natural gas	1.000 m³	11.110 kWh

scm...solid cubic meter, lcm...loose cubic meter, t...tons, l...litres, kWh...kilowatt hours, m³... cubic meters
*) as square bales, the water content of Straw and x (%) was taken into account by following formula: 1 t-atro (absolutely dry) = 1 t-lutro (air dried) * (100-x)

For the creation of the energy balances, the generated heat quantity, the heating period, the annual fuel input by type of fuel and the installed nominal capacity of the boilers are of main interest.

Classifications

Not relevant.

Regional breakdown

Laender (NUTS 2, federal provinces of Austria).

6.6. Production of Statistics, Processing, Quality assurance measures

Data capture

Predominantly manual data capture by the Department, a small but slowly increasing share of electronically submitted data

Data capture

Not relevant.

Editing and verification of external data sources

Plausibility checks are done through a comparison of the generated heat quantity and the corresponding fuel input as well as through the calculation of the efficiency of the biomass district heating plants.

In case of implausible data (e.g. missing information about fuel input, efficiency of the biomass district heating plant below 50% or above 100%) the respondents were contacted by phone.

Imputation (in the case of missing values or incomplete data)

Missing data about the district heat output were imputed by multiplying the fuel input with the according calorific value and a mean heating plant efficiency of 75% (total mean efficiency of all participating biomass district heating plants).

The mean calorific value of air dry biomass is assumed as 3 975 kWh/t.

Grossing up procedures (weighting)

Not relevant

Processing steps on the way to the final data set, (other) models and statistical estimation techniques used

After clarifying the representativeness of the samples by discussing the reported data with experts, the responses were used to calculate a specific district heat production "a" and a

specific fuel input "bj" for each fuel (j) per installed nominal boiler capacity [MWth] and heating degree day (HDD) on biomass district heat plant level.

$$a = \frac{District\ heat\ output_R}{HDD_R \times Boiler\ capacity_R}$$

$$bj = \frac{Fuel\ input_R}{HDD_R \times Boiler\ capacity_R}$$

R...report year of the survey

With the averages of these surveys' results (on Laender level) the following model is fed to estimate the yearly fuel consumption and corresponding heat production on an annual base:

The district heat output [MWh] and annual transformation input [t, 1000 m³] on Laender level is calculated with the specific constants "a" and "bj", the according heating degree days and the installed nominal boiler capacity [MWth], which is annually recorded by the Chamber of Agriculture of Lower Austria (LK NÖ).

$$District\ heat\ output_{CY} = a \times HDD_{CY} \times Boiler\ capacity_{CY}$$

$$Transformation\ input_{CY} = bj \times HDD_{CY} \times Boiler\ capacity_{CY}$$

CY...calendar year

The district heat output and transformation input of the various fuels used in the biomass district heating plants is shown for both surveys conducted by Statistics Austria so far in Table 3.

Table 3. Specific district heat output and transformation input of the various fuels for each of the Laender in the year 2005/2006 and 2009/2010.

2005/2006

BL	Specific district heat output	Transformation Input							
	$\frac{MWh}{MW*HGT}$	Bark $\frac{t-lutro}{MW*HGT}$	IWC $\frac{t-lutro}{MW*HGT}$	Sawdust $\frac{t-lutro}{MW*HGT}$	WC $\frac{t-lutro}{MW*HGT}$	Stroh $\frac{t-lutro}{MW*HGT}$	Others $\frac{t-lutro}{MW*HGT}$	Natural gas $\frac{1.000\ m^3}{MW*HGT}$	Fuel oil $\frac{t}{MW*HGT}$
B	0,4819	0,0210	0,0167	0,0045	0,1325	0,0000	0,0039	0,0009	0,0005
K	0,3530	0,0273	0,0369	0,0052	0,0625	0,0000	0,0008	0,0000	0,0017
N	1,0162	0,0306	0,1193	0,0116	0,1613	0,0038	0,0021	0,0003	0,0017
O	0,4251	0,0346	0,0381	0,0061	0,0712	0,0000	0,0010	0,0003	0,0002
S	0,4574	0,0389	0,0515	0,0072	0,0645	0,0000	0,0016	0,0006	0,0002
St	0,4059	0,0513	0,0366	0,0136	0,0535	0,0026	0,0051	0,0014	0,0022
T	0,3407	0,0181	0,0499	0,0036	0,0631	0,0000	0,0005	0,0000	0,0007
V	0,4930	0,0024	0,0915	0,0021	0,0719	0,0000	0,0050	0,0001	0,0005

2009/2010

BL	Specific district heat output	Transformation Input							
	$\frac{MWh}{MW*HGT}$	Bark $\frac{t-lutro}{MW*HGT}$	IWC $\frac{t-lutro}{MW*HGT}$	Sawdust $\frac{t-lutro}{MW*HGT}$	WC $\frac{t-lutro}{MW*HGT}$	Stroh $\frac{t-lutro}{MW*HGT}$	Others $\frac{t-lutro}{MW*HGT}$	Natural gas $\frac{1.000\ m^3}{MW*HGT}$	Fuel oil $\frac{t}{MW*HGT}$
B	0,62978	0,00023	0,01038	0,00000	0,24110	0,00000	0,00147	0,00000	0,00001
K	0,48888	0,02585	0,03098	0,00007	0,15163	0,00000	0,00346	0,00009	0,00020
N	0,52422	0,00631	0,03388	0,00144	0,17032	0,00531	0,00513	0,00021	0,00011
O	0,51134	0,00468	0,03094	0,00444	0,16422	0,00106	0,00112	0,00000	0,00007
S	0,53207	0,00654	0,04383	0,00164	0,15434	0,00000	0,00600	0,00058	0,00024
St	0,50841	0,00469	0,02530	0,00611	0,17151	0,00098	0,00206	0,00062	0,00013
T	0,41415	0,00134	0,01317	0,00000	0,14207	0,00000	0,00770	0,00018	0,00040
V	0,62681	0,01335	0,06915	0,00361	0,19265	0,00000	0,01468	0,00001	0,00029

BL...Laender, B…Burgenland, K…Carinthia, N…Lower Austria, O…Upper Austria, S…Salzburg, St…Styria, T…Tyrol, V...Vorarlberg, W…Vienna
IWC…Industrial wood chips, WC...wood chips

Other quality assurance measures

Contact by telephone in the case of implausible information (active). advice and assistance by telephone with completing the questionnaire (passive).

6.7. Publication (accessibility)

Preliminary results

The final results of the modelling are published together with the energy balances.

Final results

Three month after the follow up survey

Revisions

The most recent survey is extrapolated for the subsequent years with the corresponding HDD and the installed nominal boiler capacity, provided by the LK NÖ. After each follow-up survey, the district heat production and the corresponding transformation input for the used fuels is revised with the HDD and the moving average of the specific district heat output and the specific fuel input.

Published in:

The results of the survey are published on the homepage of Statistics Austria.

Confidentiality

Not relevant

Quality

6.8. Relevance

The main objective of the survey is to provide a reliable database for the compilation of energy balances. Since the RES Directive (Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC), where the target for a share of energy from renewable sources in the gross final consumption of energy was set for Austria at 34% came into force, this survey is an important data source for the reporting duties along this directive, additionally.

6.9. Accuracy

Sampling effects,

Not relevant.

Non-sampling effects

Not relevant.

Quality of data sources

The quality of the database of existing plants and installed capacities differs between the Laender.

Coverage (misclassifications, undercoverage/overcoverage)

Not relevant.

Missing values (unit non-response, item non-response)

Unit-Non Response: not relevant.

Item-Non Response: Missing data about the district heat output are imputed by multiplying the fuel input with the according calorific value and a mean heating plant efficiency of 75% (total mean efficiency of all participating biomass district heating plants).

Measurement errors (keying in errors)

None known.

Processing errors

None known.

Model based effects

Concentration in the range of average values if reported values are substituted because of plausibility reasons.

6.10. Timeliness and punctuality

The results are available together the most recent energy balance

6.11. Comparability

Comparability over time

Because of the identical methodology, the comparability over time of the survey in the year 2010 with the same survey by Statistics Austria in the year 2006 is given.

Comparability over region

In the context of energy balances, the spatial and sectoral comparability, for the fuels included, is given with other EU or IEA member states.

Comparability over other domains

Not relevant.

6.12. Coherence

Coherence with comparable primary statistics, used as data sources for energy balances (material input statistics, sample surveys on energy consumption in the service and production sector, sample survey on energy consumption of households and useful energy analysis) is given.

Outlook

Due to public funding of district heat from biomass and an existing potential due to a relatively high abundance of wood in some Laender, a dynamic future increase of the number of biomass district heating plants with a corresponding fuel input and district heat output can be expected in Austria.
Therefore, a survey frequency of five years is planned to continue.

List of abbreviations

€/a	Euro per year
B	Burgenland
BMLFUW	Federal Ministry of Agriculture, Forestry, Environment and Water Management
BMWFJ	Federal Ministry of Economy, Family and Youth, former Federal Ministry of Economics and Labour (formerly BMWA)
CHP	Combined Heat and Power
EG	European Community
EU	European Union
scm	Solid cubic meter
FW	District heat
HDD	Heating degree days
idgF	as amended
IEA	International Energy Agency
K	Carinthia
kW	Kilowatt
kWh	Kilowatt hours
l	Litre
LK NÖ	Agricultural Chamber of Lower Austria
LK Ö	Agricultural Chamber of Austria
LPG	Liquefied gas
m³	Cubic meter
MW	Megawatt
MWh	Megawatt hours
MWSt.	Value-added tax (VAT)
MZ	Micro census energy input of households
N	Lower Austria
O	Upper Austria
Ö	Austria
S	Salzburg
lcm	Loose cubic meter
ST	Styria
t	ton(s)
T	Tyrol
t-atro	ton(s) absolutely dry
TJ	Terajoule
t-lutro	ton(s) air dry
UBA	Umweltbundesamt GmbH Wien
V	Vorarlberg
W	Vienna

Reference to supplementary documentation/publications

Energy balances 1970 – 2009: Documentation of Methods – Quality Report. Statistics Austria. Vienna 2011.

Annex

Figure 1. Structure of the questionnaire for the survey in the year 2006.

STATISTIK AUSTRIA
Die Informationsmanager

Biomass heating plant:

Address:

Directorate Spatial Statistics
Energy Statistics

Contact: Dr. Silke Mader (Hr. Richard Riess)
Phone: +43 (1) 711 28-7624 (7304)
Fax: +43 (1) 711 28-8155
e-mail: silke.mader@statistik.gv.at
richard.riess@statistik.gv.at

Survey on fuel input and district heat output of biomass heating plants

A. GENERAL

1.) Last heating period (reference period, from/to) _____

B. HEAT DISTRIBUTION

1.) Length of the district heating network incl. connection to heat transfer station _____ m
2.) Heat quantity fed into the heating grid _____ kWh
3.) Sold heat quantity (reference period) _____ kWh

C. CONSUMER STRUCTURE

Consumer	Number	Contractual connected load
Total		**kW**
Households		**kW**
Other consumers		**kW**
Hospitals		**kW**
Schools		**kW**
Municipal offices		**kW**

D. PRICE

Mean price (excl. VAT) for consumers with a connected load < 20 kW		
Working price		€/kWh
Meter charge		€/a
Base price		€/a

	E .Biomass	F. peak production/failover (NO biomass boilers)	E+F total
a) Number of boilers			
b) total boiler nominal capacity	**kW**	**kW**	**kW**
c) total heat quantity	**kWh**	**kWh**	**kWh**
d) total fuel thermal output	**kW**	**kW**	**kW**
e) estimated full load hours	**Std.**	**Std.**	**Std.**
f) summer activity	□ yes □ no	□ yes □ no	
g) Emissions measured?		□ yes □ no	

G. FUEL INPUT

1.) Biomass

Type	Annual consumption	Unit	Average water content [%]	Price excl. VAT [€/Unit]
□ Wood chips		□ t-lutro □ t-atro □ fm □ srm		
□ Industrial wood chips		□ t-lutro □ t-atro □ fm □ srm		
□ Sawing by-products		□ t-lutro □ t-atro □ fm □ srm		
□ Bark		□ t-lutro □ t-atro □ fm □ srm		
□ Straw		□ t-lutro □ t-atro □ fm □ srm		
□ Others		□ t-lutro □ t-atro □ fm □ srm		

t-lutro…ton air dry, t-atro…ton absolutely dry, fm…solid cubic meter, srm…loose cubic meter

2.) Others

Type	Annual consumption	Unit	Price excl. VAT [€/Unit]
□ Fuel oil		□ tons □ 1.000 litres	
□ Natural gas		□ kWh □ 1.000 m³	
□ Waste ...			
□ Others ...			

Thank you very much for your co-operation.
Please return the filled questionnaire by the **9th of December** at the latest using the enclosed envelope to Statistics Austria.

Contact Person:
Name: Phone-Nr.:
e-mail: Fax-Nr.:

Figure 2. Structure of the questionnaire for the survey in the year 2010.

STATISTIK AUSTRIA
Die Informationsmanager

Biomass heating plant:	
Address:	
Sequence number:	

Directorate Spatial Statistics
Energy Statistics
Contact: Dr. Manfred Gollner / Walter Frech
Phone: +43 (1) 711 28-7573 / 7254
Fax: +43 (1) 711 28-8155
e-mail: manfred.gollner@statistik.gv.at
walter.frech@statistik.gv.at

Survey on fuel input and district heat output of biomass heating plants

GENERAL

Last heating period or reference period (DD.MM.YYYY-DD.MM.YYYY) _____

HEAT DISTRIBUTION

Heat quantity fed to the heating grid (reference period) _____ **kWh**

Sold heat quantity (reference period) _____ **kWh**

BOILER STRUCTURE

Boilers	**Biomass**	**Peak production/Failover protection** (NO biomass boilers!)
Number		
Total capacity	**kW**	**kW**
Total heat quantity	**kWh**	**kWh**

FUEL INPUT

Biomass	**Annual consumption**	**Unit**	**average water content [%]**	**Price excl. VAT [€/Unit]**
Wood chips		□ t-lutro □ t-atro □ fm □ srm		
Industrial wood chips		□ t-lutro □ t-atro □ fm □ srm		
Sawing by-products		□ t-lutro □ t-atro □ fm □ srm		
Bark		□ t-lutro □ t-atro □ fm □ srm		
Straw		□ t-lutro □ t-atro □ fm □ srm		
Others.....		□ t-lutro □ t-atro □ fm □ srm		

t-lutro…ton air dry, t-atro…ton absolutely dry, fm…solid cubic meter, srm…loose cubic meter

Other fuels	**Annual consumption**	**Unit**	**Price excl. VAT [€/Unit]**
Fuel oil		□ tons □ 1000 litres	
Natural gas		□ MWh □ 1000 m³	
Vegetable oil		□ tons □ 1000 litres	
Biogas		□ MWh □ 1000 m³	
Others		.....	

Thank you very much for your co-operation!
Please return the filled questionnaire by the DD.MM.YYYY at the latest using the enclosed envelope to Statistics Austria.

Contact person:	
Name:	Phone-Nr.:
E-mail:	Fax-Nr.: